

REMARKS

This application has been carefully reviewed in light of the final Office Action dated May 12, 2008. Claims 1 to 16 are pending in the application, of which Claims 1, 7, 8, 9, 10, 13 and 15 are independent. Reconsideration and further examination are respectfully requested.

Claims 1, 13 and 15 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 6,169,678 (Kondo '678), Claims 1 to 5, 10 to 12, 14 and 16 were rejected under 35 U.S.C. § 102(b) over U.S. Publication No. 2002/0038667 (Kondo '667), Claims 7 to 9 were rejected under 35 U.S.C. § 102(e) over U.S. Publication No. 2002/0195136 (Takabayashi), and Claim 6 was rejected under 35 U.S.C. § 103(a) over Kondo '667 in view of U.S. Patent No. 6,331,670 (Takehara). These rejections are respectfully traversed.

Claim 1

The invention of Claim 1 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements and a power converter. According to one aspect of the invention, the power converter is a DC-DC converter or an inverter provided in a position corresponding to a region surrounded by the plurality of solar cell elements.

By virtue of this arrangement, it is ordinarily possible to shorten the wiring distance from each solar cell element to the converter, thus reducing energy loss due to the impedance of the wiring.

The applied art is not seen to disclose or suggest the features of Claim 1, and in particular, is not seen to disclose or suggest at least the feature of a power converter

which is a DC-DC converter or an inverter and is provided in a position corresponding to a region surrounded by a plurality of solar cell elements.

Kondo '678 is directed to a power generation apparatus having a plurality of power converters connected to a plurality of solar battery arrays. The apparatus is constructed such that the plurality of power converters do not simultaneously suspend operation when an abnormal state is detected. See Kondo '678, Abstract.

Page 2 of the Office Action asserts that Kondo '678 (Figure 1, Column 3, lines 19 to 29 and Column 4, lines 61 to 64) discloses "a plurality of solar cell elements/solar battery arrays (11) and a power converter (21) for converting DC to AC/inverter power provided in a position corresponding to a region surrounded/electrically connected to all the solar cell elements/array (11)".

However, Figure 1 of Kondo '678 simply shows a block diagram depicting a power converter connected to each solar battery array, and indicates that the power converters are arranged outside of the solar battery arrays. In this regard, each solar battery array is constructed of plural solar battery modules, and therefore the power converters are seen to be arranged outside of the solar battery modules as well. See Kondo '678, Column 3, lines 20 to 25. Applicant submits that the arrangement as depicted in Kondo '678 is the same general arrangement as shown on the website <http://sharp-world.com/solar/generation/structure1.html> (hereinafter "Sharp 1"), in which the solar cells modules are separate from the inverter (power conditioner). Sharp 1 is cited in the accompanying Information Disclosure Statement.

Therefore, the power converters of Kondo '678 are not seen to be included as part of the solar battery modules. In contrast, in the present invention, the power

converter is included as a part of the solar cell module. Since the power converter is not part of the solar battery modules of Kondo '678, it is not seen how Kondo '678 can disclose a specific positional relationship between the solar cell elements and the power converter within the solar cell module as taught by the present invention, much less that a single DC-DC converter or inverter is provided in a position corresponding to a region surrounded by a plurality of solar cell elements. In this regard, Applicant respectfully submits that "solar cell elements" and "solar battery arrays" are not equivalent, as apparently suggested by the Office Action. For example, see website <http://www.sharp-th.com/solar/what04.html> (hereinafter "Sharp 2"), which defines a solar cell module as an arrangement of solar cells, and defines a solar array as an arrangement of solar modules. Sharp 2 is cited in the accompanying Information Disclosure Statement.

Accordingly, Claim 1 is believed to be allowable over Kondo '678.

Kondo '667 is directed to a current detector which detects a current in the collective-power path of an AC module. The AC module integrates a solar battery and an inverter and is connected in parallel with other AC modules. If the current flowing through the current path exceeds a rated current, the current detector stops the inverter in the AC module. See Kondo '667, Abstract.

Page 3 of the Office Action asserts that Kondo '667 (Figures 1 and 2, Claim 1 and paragraphs [0033] and [0036]) discloses a power conversion unit electrically connected to a power converter of an adjacent power conversion unit.

However, Kondo '667 is not seen to disclose or suggest a power converter which is a DC-DC converter or an inverter and is provided in a position corresponding to a region surrounded by a plurality of solar cell elements. In particular, Figures 2, 3, 4 and 13

are seen to show a relationship between the solar battery and a power conversion unit which includes the inverter, in which the power conversion unit is positioned at a corner of an end portion of the AC module. In this regard, Kondo '667 is not seen to disclose that the power conversion unit or the inverter is surrounded by a plurality of solar cell elements.

Thus, Claim 1 is believed to be allowable over Kondo '667.

Accordingly, the applied art is not seen to disclose or suggest at least the feature of a power converter which is a DC-DC converter or an inverter and is provided in a position corresponding to a region surrounded by a plurality of solar cell elements.

Therefore, independent Claim 1 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 7

The invention of Claim 7 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. According to one aspect of the invention, the power converter is arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by the solar cell elements to the power converter.

The applied art is not seen to disclose or suggest the features of Claim 7, and in particular is not seen to disclose or suggest at least the feature of a power converter arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by a plurality of solar cell elements to the power converter.

Takabayashi is directed to a plurality of solar cells interconnected in series or parallel with one positive terminal and one negative terminal. At least part of an electric

line is not insulated, and instead is grounded at an electrical middle point between the positive and negative terminals. See Takabayashi, Abstract.

Pages 5 and 6 of the Office Action assert that Takabayashi (Figures 11 and 13) discloses a power converter/conditioner which achieves a position of minimizing a sum of all collecting losses by being the closest to the position of the solar cell array when collecting power generated by the solar cell elements.

However, Figures 11 and 13 of Takabayashi are not seen to disclose a power converter arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by a plurality of solar cell elements to the power converter. In particular, Figure 11 is seen to indicate that the power converter is located considerably apart from each solar cell element. More specifically, Figure 11 indicates that the power converter is located outside of terminals 1104 and 1105 which are located at the end of a series of interconnected solar cells. In addition, Figure 13 is simply a block diagram which at best shows that the power conditioner is simply connected to the solar cell array. Accordingly, Takabayashi is not seen to disclose a power converter arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by a plurality of solar cell elements to the power converter.

Therefore, independent Claim 7 is believed to be in condition for allowance, and such action is respectfully requested.

Claims 8 and 9

Independent Claim 8 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. The solar cell elements each

respectively have a terminal member, and the power converter is arranged in the closest position between the terminal members in a state of arranging the solar cell elements.

Independent Claim 9 is directed to a solar cell module comprising at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. The solar cell elements each respectively have a terminal member, and the power converter is arranged in the closest position between the terminal members in a state of arranging the solar cell elements, and in a position of minimizing a sum of all collecting losses when collecting the power generated by the solar cell elements.

The applied art is not seen to disclose or suggest the features of Claims 8 and 9, and in particular is not seen to disclose or suggest at least the feature of providing each solar cell element with a terminal member.

Page 6 of the Office Action asserts that Takabayashi (Figures 11 to 13) discloses a plurality of solar cell elements (1101), each respectively having a terminal member (1104 and 1105).

However, as can be seen from Takabayashi's Figures 9 and 11, Takabayashi's solar cell elements are arranged together in strings, with a terminal (e.g., 903 or 904 of Figure 9 or 1104 or 1105 of Figure 11) placed only at the end of a string of solar cell elements as shown in Figure 9 or placed only at the end of an array of strings of solar cell elements as shown in Figure 11. In contrast, in the present invention, each solar cell element has a terminal member. Accordingly, Takabayashi is not seen to disclose or suggest providing each solar cell element with a terminal member.

Moreover, and with particular regard to Claim 9, Takabayashi is not seen to disclose or suggest a power converter arranged in a position of minimizing a sum of all collecting losses, as discussed above with regard to Claim 7.

Therefore, independent Claims 8 and 9 are believed to be in condition for allowance, and such action is respectfully requested.

Claim 10

Independent Claim 10 is directed to a solar cell module comprising at least one power conversion unit having two adjacent solar cell elements and a power converter which is a DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between the two adjacent solar cell elements.

The applied art is not seen to disclose or suggest the features of Claim 10, and in particular is not seen to disclose or suggest at least the feature of a power converter which is DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between two adjacent solar cell elements.

Page 4 of the Office Action asserts that Kondo '667 (Figures 2 and 4 and paragraph [0084]) discloses a power converter/inverter (21) provided in a position on the extension of a gap between two adjacent solar cell modules.

However, as discussed above with respect to Claim 1, Kondo '667's Figures 2, 3, 4 and 13 show that Kondo's power conversion unit which includes an inverter is positioned at a corner of an end portion of the AC module. Accordingly, it is not seen how Kondo'667 discloses a power converter which is a DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between two adjacent solar cell elements. In this regard, Applicant respectfully submits that "solar cell

elements” and “solar modules” are not equivalent, as apparently suggested by the Office Action. See Sharp 2.

Accordingly, Claim 10 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 13

Independent Claim 13 is directed to a solar cell module comprising at least one power generation unit having a plurality of solar cell elements and a terminal box provided in a position corresponding to a region surrounded by all the solar cell elements to collect outputs of the solar cell elements.

The applied art is not seen to disclose the features of Claim 13, and in particular is not seen to disclose or suggest at least the feature of a terminal box provided in a position corresponding to a region surrounded by all of a plurality of solar cell elements.

In this regard, page 2 of the Office Action asserts that Kondo ‘678 (Figure 1 and Column 3, lines 3 to 29) discloses a terminal box (21) provided in a position corresponding to a region surrounded by the plurality of solar cell elements.

However, as discussed above, Kondo ‘678’s Figure 1 is simply a block diagram of a power converter connected to each solar battery array, and indicates that the power converters are arranged outside of the solar battery arrays and the solar battery modules. In this regard, there is not seen to be any disclosure in Kondo ‘678 of a specific positional relationship between the solar cell elements and the power converter within the solar cell module as taught by the present invention, much less disclosure of a terminal box in a position corresponding to a region surrounded by all of a plurality of solar cell elements.

Therefore, independent Claim 13 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 15

Independent Claim 15 is directed to a solar cell module comprising at least one power generation unit having two adjacent solar cell elements and a terminal box provided in a position corresponding to a region on extension of a gap between the two adjacent solar cell elements to collect outputs of the two adjacent solar cell elements.

The applied art is not seen to disclose or suggest the features of Claim 15, and in particular is not seen to disclose or suggest at least the feature of a terminal box provided in a position corresponding to a region on extension of a gap between the two adjacent solar cell elements.

Pages 2 and 3 of the Office Action assert that Kondo '678 (Figure 1 and Column 3, lines 3 to 29) discloses a terminal box/power generation unit (21) placed in a region next to the solar battery module/array, wherein there is a gap between the two adjacent solar cell elements/arrays to collect outputs of the two adjacent solar cell elements.

However, as discussed in detail above, Kondo '678's Figure 1 is seen to simply depict a block diagram of a power converter connected to each solar battery array, and to indicate that the power converters are arranged outside of the solar battery arrays and the solar battery modules. In this regard, there is not seen to be any disclosure in Kondo '678 of a specific positional relationship between the solar cell elements and the power converter within the solar cell module as taught by the present invention, much less disclosure of a terminal box provided in a position corresponding to a region on extension

of a gap between the two adjacent solar cell elements to collect outputs of the two adjacent solar cell elements.

Therefore, independent Claim 15 is believed to be in condition for allowance, and such action is respectfully requested.

The other claims in the application are each dependent from the independent claims discussed above, and are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

REQUEST FOR INTERVIEW

If upon consideration of this response, the Examiner still has concerns as to the patentability of the claims, Applicant respectfully requests that the Examiner contact Applicant's undersigned representative to arrange an interview.

CONCLUSION

The application is believed to be in condition for allowance, and a Notice of Allowance is respectfully requested.

No fees are believed due; however, should it be determined that additional fees are required, the Director is hereby authorized to charge such fees and any additional fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required during the entire pendency of this application, or to credit any overpayment, to Deposit Account 06-1205.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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